Ninety-Fourth

Meeting

of

The Electrochemical Society, Inc.

NEW YORK CITY

October 14, 15, 16, and 17, 1948

LOCAL COMMITTEE

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Bell Telephone Laboratories
Murray Hill, N. J.

Chairman, Finance

Frederick A. Lowenheim
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Harry R. Copson
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Chairmen, Ladies' Entertainment

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Chairman, Plant Visits

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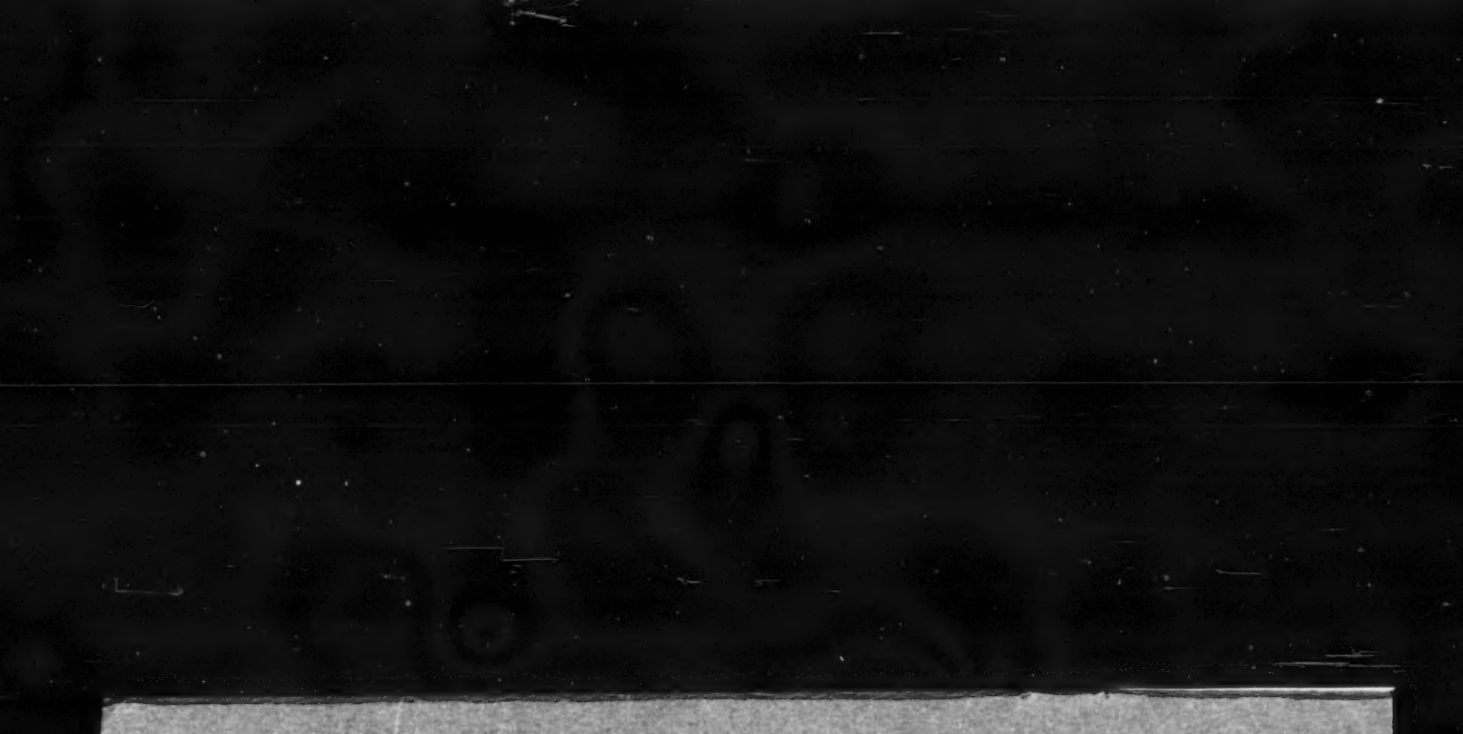

Ninety-Fourth Meeting

HOTEL INFORMATION

Convention Headquarters will be the **Hotel Pennsylvania,** Seventh Avenue at 33rd Street, New York City. Room reservations must be made at least ten days before the Convention, preferably by means of the room reservation post card supplied for the purpose. The rates at the Pennsylvania are from $4.00 to $7.00 for a single room with bath; from $7.00 to $12.00 for a double room with bath. Among other hotels, the Knickerbocker, 120 West 45th Street, offers single room with bath from $4.00 to $5.00 and double room with bath from $5.00 to $6.00.

REGISTRATION

The registration desk will be located in the Penn Top Foyer (18th floor of the hotel). Registration fees will be as follows:

Members	$6.00	Students	$2.00
Guests	8.00	Ladies	1.00

PLACES OF MEETINGS

All meetings of the Convention will be on the 18th floor of the Pennsylvania Hotel. Technical sessions and the Thursday evening banquet and dance will be in the Penn Top Room. The Thursday luncheon will be in the Salle Moderne.

ACHESON MEDAL BANQUET

The Acheson Medal Banquet will be held in the Penn Top Room, Thursday evening at 7:30 P.M. Preceding the banquet at 6:45 P.M., a reception will be tendered the medalist in the Salle Moderne. The Edward Goodrich Acheson Medal and Prize will be awarded to Dr. Duncan Arthur MacInnes, former president of the Society, for his distinguished contributions to the science of electrochemistry. Following presentation of the Medal and Prize by President James A. Lee, Dr. R. M. Burns will describe the "Personal Traits of the Medalist" and Professor

Andrew R. Gordon of Toronto University will present an address on the "Scientific Contributions of the Medalist." Dr. MacInnes will respond with the Medalist's Address.

Following the banquet and ceremonies, there will be dancing.

FRIDAY LUNCHEON

The Convention Luncheon will be held on Friday, October 15th, at 12:45 P.M. in the Salle Moderne.

A distinguished speaker from the United States Atomic Energy Commission, probably Dr. Ralph Johnson, Acting Director of the Division of Research, will address the luncheon on some of the chemical and chemical engineering problems of the atomic energy program.

LADIES' PROGRAM

Fashion shows, shopping tours, visits to places of interest, radio broadcasts, and similar activities have been arranged to suit the individual interests of the ladies attending the Convention. Hostesses familiar with New York will act as guides and will be available to arrange special projects.

LANGUILD CONVENTION SERVICE

The Entertainment Committee has arranged with the Languild Convention Service to aid members and convention visitors on Thursday and Friday. This Service will maintain a desk near the registration desk and be able to supply without cost to members and visitors services of the following nature:

1. They will give advice and procure tickets to theatres, concerts, radio broadcasts, etc.
2. They are prepared to advise on night club activities and will make reservations for guests.
3. Advise on restaurants and eating places of distinction of all the various types represented in New York.
4. Air plane and railroad transportation will be procured.

5. Secretarial service will be available.
6. Advice on shopping and aid in shopping will be furnished.
7. Advice on museums, fashion shows and sightseeing will be available.

Those who wish to secure these services prior to the convention may write beforehand to Languild Convention Service 114 Washington Place, New York 3, N. Y.

PLANT TRIPS

Thursday Afternoon, October 14th

Bell Telephone Laboratories, Murray Hill, New Jersey—various departments and projects of interest to electrochemists.

Air Reduction Company, Murray Hill, New Jersey—demonstrations of new developments in oxyacetylene welding and cutting, including electronically controlled multiple-torch cutting.

(Both above trips start from Hotel at 2:00 P.M. in same buses, the parties to separate after reaching Murray Hill. Will return in time for reception at 6:00 P.M.)

Friday Afternoon, October 15th

International Nickel Company, Precision Casting Plant Bayonne, New Jersey—opportunity to watch the step-by-step manufacture by the "lost-wax" or investment molding method of typical intricate small metal parts especially amenable to this modern process. (Leave Hotel in chartered buses at 2:00 P.M.)

Nassau Smelting & Refining Company, Tottenville, Staten Island—modern fire refining methods, including low-frequency melting of brass, arc furnaces for bronze and an electric smelter. (Leave Hotel in chartered bus at 2:00 P.M. **Party limited to 50 persons.**)

COST OF BANQUET AND LUNCHEON

Thursday Evening Banquet—Single	$ 7.00
For couple	12.00
Friday Luncheon	2.75

REPRINTS

Copies of the July, August, September, and October issues of the **Journal of The Electrochemical Society** containing papers presented before the Convention will be available at the Registration desk. The price of single copies of the **Journal** is 75 cents.

TYPEWRITTEN DISCUSSION

Members wishing to present written discussion on any of the papers listed in this program will please submit three copies of each to R. M. Burns, Secretary of the Society, 235 West 102nd Street, New York 25, New York.

DETAILED PROGRAM

WEDNESDAY, OCTOBER 13, 1948

10:30 A.M.—Committee on Division By-Laws. Penn Top.

1:30 P.M.—Ways and Means Committee. Penn Top.

4:00 P.M.—Local Section Advisory Committee. Penn Top.

7:00 P.M. to 9:30 P.M.—Meeting of Board of Directors. Penn Top.

THURSDAY, OCTOBER 14, 1948

8:00 A.M. to 5:00 P.M.—Registration in Penn Top Foyer.

9:00 A.M.—Formal opening of the 94th Convention in Penn Top Room. Introduction by General Chairman K. G. Compton and brief address by President James A. Lee.

Symposium on Batteries
with Dr. George W. Vinal presiding

9:15—R. C. Kirk and A. B. Fry, The Dow Chemical Company, Midland, Michigan.
"Magnesium Dry Cells"

Magnesium dry cells patterned after the Leclanché D size cells have shown great promise in the initial development. The best cells contained an AZ31X magnesium alloy anode, MnO_2 and acetylene black

cathode, and an alkali or alkaline earth bromide electrolyte, inhibited with ammonium chromate, and gelled with a flour-starch mixture. The discharge characteristics were in general similar to those of zinc cells, and successful storage was indicated on the basis of incomplete storage tests.

9:30—H. F. McMurdie and E. Golovato, National Bureau of Standards, Washington, D. C.

"A Study of the Modifications of Manganese Dioxide"

Past work on the modifications of MnO_2 of interest in dry cell manufacture is reviewed. New x-ray data, at both room and elevated temperatures, combined with differential heating curves, lead to the conclusion that five types of MnO_2 exist: (1) well crystallized pyrolusite, (2) gamma MnO_2, a poorly crystallized pyrolusite, (3) ramsdellite, (4) cryptomelane, a form containing essential K or Na, and (5) delta MnO_2, believed to be a poorly crystallized cryptomelane. A new crystal form of M_2O_3 stable above 1170°C. was found to be cubic of spinel structure.

10:00—N. C. Cahoon and George W. Heise, National Carbon Company, Cleveland, Ohio.

"The Situs of the Depolarizing Reaction in the Dry Cell"

Measurements of pH and analyses of portions of the manganese dioxide: carbon mix show that the depolarizing reaction in the cathode of the modern cylindrical type dry cell on heavy continuous test begins in the middle and inner portion of the bobbin, i.e., those portions nearest the central carbon electrode. As discharge proceeds, the reaction (reduction of MnO_2) spreads to include the remainder of the cathode, the outer portions being reduced to a greater extent than the rest of the bobbin.

10:30—G. W. Heise, E. A. Schumacher, and N. C. Cahoon, National Carbon Company, Cleveland, Ohio.

"A Heavy Duty Chlorine Depolarized Cell"

Chlorine can readily be activated electrochemically at carbon electrodes, these, in

combination with conventional metal anodes, giving primary cells of high initial voltage (2.05-2.12 with zinc; 2.85-2.92 with magnesium) and good operating characteristics. Two chlorine-depolarized reserve-type cells are described, one of high capacity at moderate drain (6 amp. /sq. ft. [0.65 amp. /dm.^{2}]), the other designed for an exceedingly heavy discharge rate (75-150 amp. /sq. ft. [8-16 amp. /dm.^{2}]) for periods of only a few minutes.

11:00—H. J. McDonald and Edward Schaschl, Illinois Institute of Technology, Chicago, Illinois.

"A Low Temperature Liquid Sulfur Dioxide Cell"

An investigation was made to determine the possibility of constructing a practical low temperature cell in a liquid sulfur dioxide medium. Optimum cell characteristics, manufacturing difficulties, and cost of materials were kept in mind while making this study. Magnesium and sodium were chosen as anodes because of high potential and low cost. The cell Na; IBr_3, $FeCl_3$, SO_2; Fe, was the most promising cell developed. Discharge characteristics, shelf life, and effectiveness of insulating materials were then investigated.

11:30—U. B. Thomas, Bell Telephone Laboratories, Murray Hill, New Jersey.

"The Electrical Conductivity of Lead Dioxide"

The electrical conductivity of lead dioxide has been measured for dense samples prepared by the electrolysis of lead perchlorate and other lead salts and for porous samples prepared from storage battery oxides and from pressed powder. The specific resistance of the dense samples is of the order of 2×10^{-4} ohm-cm. That of the battery material is 74×10^{-4} ohm-cm. The resistance increases with temperature by about 0.2 per cent per degree at room temperature. A mechanism for conduction is proposed which asumes that lead dioxide is not of exact stoichiometric composition, but contains an excess of lead, which is considered to be dissociated into tetravalent lead ions and free electrons. The conductivity is due to the latter.

12:00—A. Fleischer, Nickel Cadmium Battery Corporation, Easthampton, Massachusetts.

"Sintered Plates for Nickel Cadmium Batteries"

The development of the nickel-cadmium alkaline battery with sintered nickel plates is discussed, reviewing the work and problems encountered in the preparation of porous plaques by sintering carbonyl nickel and in the introduction of active mass by an impregnation process.

THURSDAY AFTERNOON
OCTOBER 14, 1948

General Session with
President James A. Lee presiding

2:30 P.M.—Andrew Gemant, The Detroit Edison Company, Detroit, Michigan.

"The Nature of Negative Ions in Liquid Hydrocarbons"

This investigation was carried out with electrolytically conducting solutions in xylene and hydrocarbon oil, prepared by dissolving an organic amine, an aliphatic acid, and a phenolic compound in the hydrocarbon solvent. It was shown that the negative ions in these solutions are essentially phenol-solvated anions of the aliphatic acid present. Negative conducting particles in oxidized oils appear to be of the same type.

3:00—Colin G. Fink and Joseph S. Smatko, Columbia University, New York City.

"Bone Fixation and Corrosion Resistance of Stainless Steels to the Fluids of the Human Body"

Bone fixation plates and screws were prepared from three different stainless steels and from one chromium-cobalt alloy and tested under the most carefully controlled conditions, closely duplicating the conditions prevailing in the normal human body. Results showed that stainless steel RKA2, 18/8, was the most corrosion resistant.

Thursday

3:30—Andrew Dravnieks and Hugh J. McDonald, Illinois Institute of Technology, Chicago, Illinois.

"The Zone of Metal Phase Consumption in Gas Metal Reactions"

It is shown by an analysis of the scale growth process that the scale of even approximately uniform composition formed in the reaction between gas and metal must consist of at least two layers. One layer is formed by the outward migration of metal ions and electrons through the scale, the other forms under the scale in the zone of consumption of the metal phase. The inner layer is vital for the maintenance of metal transport to the bulk of the scale and grows at a gas pressure of the order of the dissociation pressure of the scale substance.

4:00—B. O. Heston and Sam R. Faris, University of Oklahoma, Norman, Oklahoma.

"Use of the Stationary Platinum Micro-Electrode for Detecting Oxidation Reactions"

Platinum micro-electrodes have been used to investigate the electrolytic oxidations of certain organic compounds. Current-voltage curves resembling polarograms have been made for aqueous sulfuric acid solutions of ethanol, propanol-1, butanol-1, and ethylene glycol. All these curves exhibit a "break" or wave at an anode potential of approximately 1.0 volt versus the saturated calomel electrode.

4:30—R. L. Burwell, Jr., and Thomas P. May, International Nickel Company, New York, New York.

"The Measurement of the Permeability Characteristics of Anodic Films on Aluminum"

Techniques have been investigated for quantitatively studying the permeability of anodic aluminum oxide by measurement of the diffusion of salts through the film, rates of osmosis using the film as the membrane, rates of water transport through the film, and conductance of the film using salt solutions as electrolytes. Films prepared in chromic acid and sulfuric acid were equally permeable.

Thursday

5:00—John Kronsbein, Hoosier Cardinal Corporation, Evansville, Indiana.

"The Oxygen Efficiency in Anodic Oxidation of Aluminum"

Experiments are described that lead to the abandonment of the view that anodic coatings on aluminum "grow inward" because of slow chemical solubility of the oxide. It is suggested that fraction of electricity passed through an anodizing cell that is responsible for formation of aluminum oxide, the remainder causing either generation of free oxygen or anodic dissolution of the metal.

FRIDAY, OCTOBER 15, 1948

Symposium on Electrodeposition
with Dr. A. G. Gray presiding

9:00 A.M.—David Schlain and John D. Prater, Bureau of Mines, Salt Lake City, Utah.

"Electrodeposition of Gamma Manganese"

Procedures are given by which electrolytic manganese can be consistently deposited in the flexible gamma form rather than the usual brittle alpha form. With electrolytes containing manganese and ammonium sulfates and free of sulfur dioxide or colloidal sulfur, excellent deposits were obtained on copper cathodes at current efficiencies of 62 to 72%; deposits on stainless steel cathodes were much poorer.

9:30—W. A. Wesley and H. R. Copson, International Nickel Company, Bayonne, New Jersey.

"Coating Steel with Nickel by Immersion in Nickel Chloride Solutions"

A simple method for depositing controlled amounts of nickel on steel by chemical displacement from a hot nickel chloride, boric acid solution is described. Deposits up to 30 millionths inch can be obtained and, by heat treatment, made adherent.

Friday

10:00—J. W. Cuthbertson and R. M. Angles, Tin Research Institute, Middlesex, England.

"The Electrodeposition and Properties of Tin-Zinc Alloys"

Tin and zinc can be co-deposited in all proportions from solutions containing sodium stannate, sodium hydroxide, sodium zinc cyanide, and free sodium cyanide, operated at 65°C. and at a cathode current density, for still solutions, of 10-30 amp./ft.^{2} (1.08-3.24 amp./dm.^{2}) using alloy anodes of the same composition as the alloy to be deposited. Plate containing 78 per cent tin, not less than 0.0003 in. thick, is superior in protective value to either cadmium or zinc plate of comparable thickness, and moreover is extremely easy to solder.

10:30—F. C. Mathers and John C. Griess, Jr., Indiana University, Bloomington, Indiana.

"The Electrodeposition of Lead from p-Toluene Sulfonate Solutions"

A method for the preparation of p-toluene sulfonic acid is given. The effects of a number of addition agents on cathode deposits of lead from solutions of lead-p-toluene sulfonate containing free sulfonic acid were determined. Smooth solid deposits, at least suitable for refining, were obtained by the use of aloes residue combined with glue as the addition agent.

10:45—T. B. Lloyd, Muhlenberg College, Allentown, Pennsylvania, M. R. Lauver, Westvaco Chlorine Products Company, Carteret, New Jersey, and F. Hovorka, Western Reserve University, Cleveland, Ohio.

"The Effect of Ionic Addition Agents on the Polarization of Electrodeposition of Copper"

11:15—Roy E. Webb and Henry B. Linford, Columbia University, New York City.

"The Effect of Pressure on Current Efficiency of Copper Electrodeposition from Cyanide Solutions"

A simple mathematical relationship has been developed relating copper deposition efficiency with total pressure and current density. At any given current density, the current efficiency has been found to increase with a decrease in total pressure.

11:45—Colin G. Fink and Vasant M. Dokras, Columbia University, New York City.

"Electrodeposition and Electrowinning of Germanium"

An exploratory survey was made of the electrodeposition of germanium from aqueous, non-aqueous, and fused electrolytes. Only flash coatings were obtained from aqueous electrolytes unless the germanium was co-deposited with copper. Somewhat better results were obtained with non-aqueous electrolytes. Molten germanium was deposited in quantity from a solution of germanium oxide in fused sodium tetraborate.

12:15 P.M.—W. E. Clark and M. L. Holt, University of Wisconsin, Madison, Wisconsin.

"Electrodeposition of Cobalt-Tungsten Alloys from a Citrate Bath"

An aqueous bath suitable for the electrodeposition of cobalt-tungsten alloys, containing approximately 50% tungsten is described. Bright cathode deposits are obtained over a wide range of current densities.

12:45—Convention Luncheon, Salle Moderne.

Symposium on Electrodeposition
(continued)

2:30 P.M.—C. B. F. Young, Brooklyn Polytechnic Institute, Brooklyn, New York, and E. S. Roszkowski, Jacques Kreisler Company, North Bergen, New Jersey.

"Electrodeposition of Nickel from Phosphate Baths"

Mat and adherent nickel deposits which could be buffed to a bright finish have been successfully electrodeposited from a solution containing nickel phosphate and phosphoric acid in various amounts at temperatures ranging from 25°C. (75°F.) up to 85°C. (185°F.) and at current densities varying from 20 to 1200 amp./sq. ft. (2.2 to 130 amp./sq. dm.).

3:00—M. H. Lietzke and M. L. Holt, University of Wisconsin, Madison, Wisconsin.

"Co-deposition of Tungsten and Iron from an Aqueous Ammoniacal Citrate Bath"

An ammoniacal citrate bath containing sodium tungstate gives iron-tungsten alloys which contain about 50 per cent tungsten. The same type of bath may be used also for electrodeposition of nickel-tungsten and cobalt-tungsten alloys.

3:30—I. Larson, E. I. du Pont de Nemours and Company, Niagara Falls, New York, R. W. Moulton and G. L. Putnam, University of Washington, Seattle, Washington.

"Physical Properties of Iron Deposited from Chloride Baths"

Determination was made of the effects of pH, temperature, current density, and ferric iron concentration on the physical properties of iron deposited from a chloride bath corresponding to the composition specified for the U. S. Rubber Company "Ekko" process. Average tensile strength varied from 37,700 to 68,700 psi, with elongations of 0 to 12.5 per cent. Of the variables investigated, change in pH produced the most pronounced effect on the properties of the iron.

4:00—Colin G. Fink and Morris Feinleib, Columbia University, New York City.

"Electrodeposition and Electrochemistry of the Deposition of Synthetic Resins"

Anodic deposits several millimeters thick from synthetic resin lattices were built up rapidly, at unusually low potentials, and very high current and energy yields. Deposition was effected on soluble anodes or on diaphragms interposed between anode and latex. Applications are suggested.

Friday

4:30—Frank H. Hurley, Reed College, Portland, Orègon, and Thomas P. Wier, Jr., Shell Oil Company, Houston, Texas.

"Electrodeposition of Metals from Fused Quaternary Ammonium Salts"

Electrolytic studies on fused mixtures of ethyl pyridinium bromide and metallic chlorides have shown that the following metals can be deposited on the cathode: Ag, Cu, Bi, Pb, Sn, Ni, Co, Cd, Fe, Zn, and Al. Tests involving metallic sulfates and nitrates, as well as mixtures employing fused benzyl pyridinium bromide showed that these metals can be deposited except in cases where non-ionic complex compounds are formed.

SATURDAY, OCTOBER 16, 1948

Symposium on Electrolytic Production of Metals with Dr. R. E. Cushing presiding

9:00 A.M.—Francis C. Frary, Aluminum Company of America, New Kensington, Pennsylvania.

"The Electrolytic Production of Aluminum"

The development of methods for the electrolytic production of aluminum is discussed. Problems involving heat loss, anode effect, and removal of aluminum from the bath, and modern methods of their solution are described. Construction and operation of the newest type of the Soderberg electrode is detailed and reference is made to the three-layer electrolytic refining process through which very high purity aluminum is obtained.

9:30—W. J. Kroll, C. Travis Anderson, H. P. Holmes, L. A. Yerkes, and H. L. Gilbert. U. S. Bureau of Mines, Albany, Oregon.

"Large-Scale Laboratory Production of Ductile Zirconium"

Equipment for the production of 60 pounds of zirconium sponge a cycle has been placed in operation. Zirconium carbide, prepared from zircon and carbon in an electric arc furnace, is chlorinated in improved equipment capable of producing over 300 pounds a day.

Saturday

10:00—M. L. Holt and L. E. Vaaler, University of Wisconsin, Madison, Wisconsin.

"The Electrolytic Reduction of Aqueous Tungstate Solutions"

A "catalytic reduction" theory is proposed to explain the electrolytic reduction of aqueous tungstate solutions in the presence of co-depositing metals such as iron, nickel, and cobalt.

10:30—R. Piontelli, University of Milan, Italy.

"Lead Refining with Sulfamate Baths"

The plant of the Italian firm for electrolytic lead refining with sulfamate baths, A. Tonolli and Company, is described briefly.

11:00—J. H. Jacobs and P. E. Churchward, Bureau of Mines, U. S. Department of the Interior, Boulder City, Nevada.

"Electrowinning of Manganese from Chloride Electrolytes"

It is concluded that the electrowinning of manganese from a chloride electrolyte is feasible. A comparison between the chloride process and the sulfate process is made, pointing out the chief advantages and disadvantages.

11:30—R. R. Lloyd, J. B. Rosenbaum, V. E. Homme, and L. P. Davis, Bureau of Mines, Boulder City, Nevada.

"Pilot Plant Production of Electrolytic Chromium"

The operation of a pilot plant for the production of electrolytic chromium from low-grade domestic ores is discussed, with emphasis on the techniques necessary to produce an adequately pure chromic sulfate electrolyte from the mixture of metal sulfates obtained by acid dissolution of the ore.

12:00—B. G. Hunt, The Consolidated Mining and Smelting Company of Canada, Ltd., Trail, B. C., Canada.

"A New Electrolytic Cell for Magnesium and Chlorine Production"

A new type of electrolytic cell has been developed for the production of magnesium and chlorine from molten magnesium chloride electrolyte. The design features close

spacing of electrodes, elimination of the usual refractory partition between anode and cathode, and a separate metal well. Construction and operation of a cell rated at 10,000 amperes are described in detail and the design of a 30,000 ampere cell is discussed briefly.

12:30—M. Sem, J. Sejersted, and O. Böckmann, Elektrokemisk A. S., Oslo, Norway.

"Twenty-five Years' Development of the Soderberg System in Aluminum Furnaces"

A review is given of the 25 years of development work which has been devoted to the Soderberg electrode in aluminum production. The latest type of these electrodes with vertical contact studs, direct collection of furnace gas, and a gas burner have given excellent results in furnaces of 60,000 amperes and higher. It combines the advantages of both open and closed furnaces.

1:00—C. L. Mantell, Consulting Chemical Engineer, New York, New York.

"Electrolytic Manganese, Its Technology and Applications"

More than 20 million pounds of electrolytic manganese, 99.9 plus per cent purity, have been produced and sold. The manufacture of this metal by electrowinning in a two-compartment cell with sulfate electrolyte is described. Some of the properties and various applications are described.

MEETINGS OF A.S.T.M. COMMITTEE B-8 ON ELECTRODEPOSITED METALLIC COATINGS

Held in conjunction with Convention of The Electrochemical Society.

Wednesday, October 13, 1948

9:00 A.M.—B-8 Advisory Committee and Working Sections (Closed)

10:30—Subcommittee V on Supplementary Protective Finishes for Metallic Coatings (Visitors Welcome)

1:30 P.M.—Subcommittee IV on Electroplating Practice (Visitors Welcome)

3:30—Subcommittee II on Performance Tests (Visitors Welcome)

Evening—Working Sections (Closed)

Thursday, October 14, 1948

Breakfast meetings--Miscellaneous (Closed)

10:00 A.M.—Subcommittee III on Conformance Tests (Visitors Welcome)

1:00 P.M.—Subcommittee I on Specifications, Papers, and Definitions (Visitors Welcome)

3:00—Committee B-8 on Electrodeposited Coatings (Visitors Welcome)

SPRING MEETING
at the
BENJAMIN FRANKLIN HOTEL
Philadelphia, Pennsylvania
May 4, 5, 6, and 7, 1949

SESSIONS ON

Rare Metals
Luminescence
Theoretical Electrochemistry

Acceptable manuscripts for the Spring Meeting submitted before January 1, 1949 will be published in the **Journal of The Electrochemical Society** prior to the Spring Meeting. February 15th is the deadline for receipt of manuscripts or abstracts of papers to appear on the program.

Office of the Secretary
235 West 102nd Street
New York 25, New York

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